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A. S. T. M.

PLEXIGLAS

Molding Powders



ROHM & HAAS COMPANY
PHILADELPHIA 5, PENNSYLVANIA





PLEXIGLAS

*One of the
great new
materials
of our time*

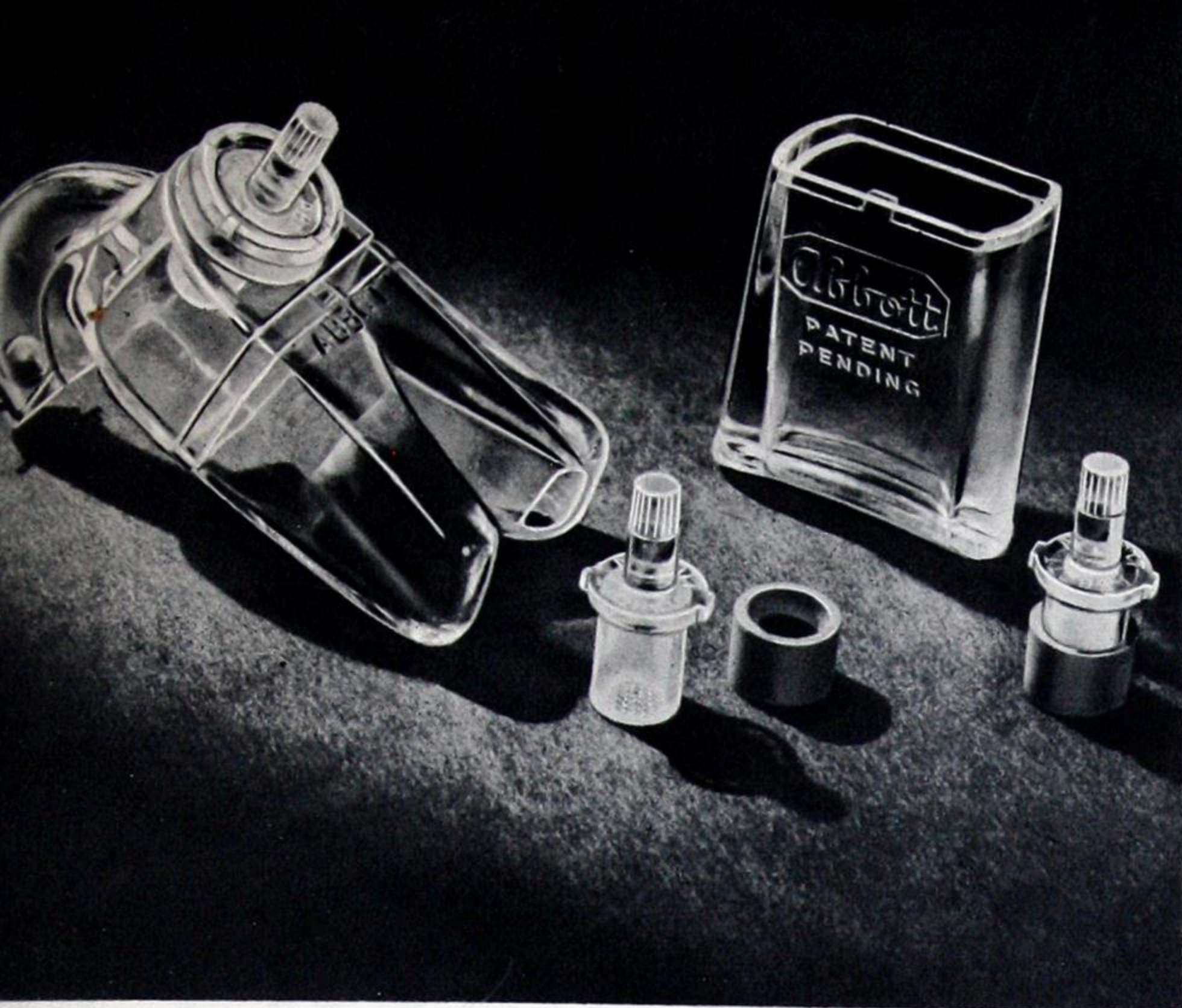
PLEXIGLAS acrylic plastic powders for injection, extrusion and compression molding are manufactured in this plant of the Rohm & Haas Company at Bristol, Pennsylvania. Other plants of the company are located in Philadelphia, Pennsylvania; Knoxville, Tennessee; and Houston, Texas.



When large numbers of identical PLEXIGLAS parts are required, molding from powder offers many direct and indirect economies. To take full advantage of these possible savings, prospective users of such parts should consult custom molders experienced in producing acrylic moldings. The services of the Rohm & Haas technical staff are available for assistance in the design and execution of PLEXIGLAS parts.

Rohm & Haas products have played a leading part in the development of the plastics industry. In 1935 the introduction of the company's transparent acrylic sheet, PLEXIGLAS, gave the industry its first material with excellent optical properties, lasting clarity, and weather resistance. PLEXIGLAS in molding powder form was introduced in 1938 to fill the need of molders for an acrylic resin powder with qualities matching those of the cast sheet material. Since then, Rohm & Haas research has resulted in improved molding powder formulations and acrylic molding techniques, enhancing the reputation of PLEXIGLAS as "one of the great new materials of our time."

Cover Illustration: Typical injection molded automotive parts. Dodge front end medallion by Erie Resistor Corporation, and Bay Manufacturing Division, Electric Auto-Lite Company; Ford body escutcheon by Hoosier-Cardinal Corporation; Mercury front end medallion by Gills Molding Corporation and Hoosier-Cardinal Corporation; De Soto steering wheel medallion by Bay Manufacturing Division, Electric Auto-Lite Company; Kaiser steering wheel medallion by Bay Manufacturing Division, Electric Auto-Lite Company.



Penicillin inhalator components, injection molded by Rockford Molded Products for Abbott Laboratories.

easy to mold

The excellent flow characteristics of PLEXIGLAS molding powders permit satisfactory molding over a wide range of temperatures and pressures. Molders using PLEXIGLAS can work out economical cycles for rapid production and low costs. PLEXIGLAS can be processed in standard injection molding machines without the use of special auxiliary equipment.

WHY PLEXIGLAS IS PREFERRED

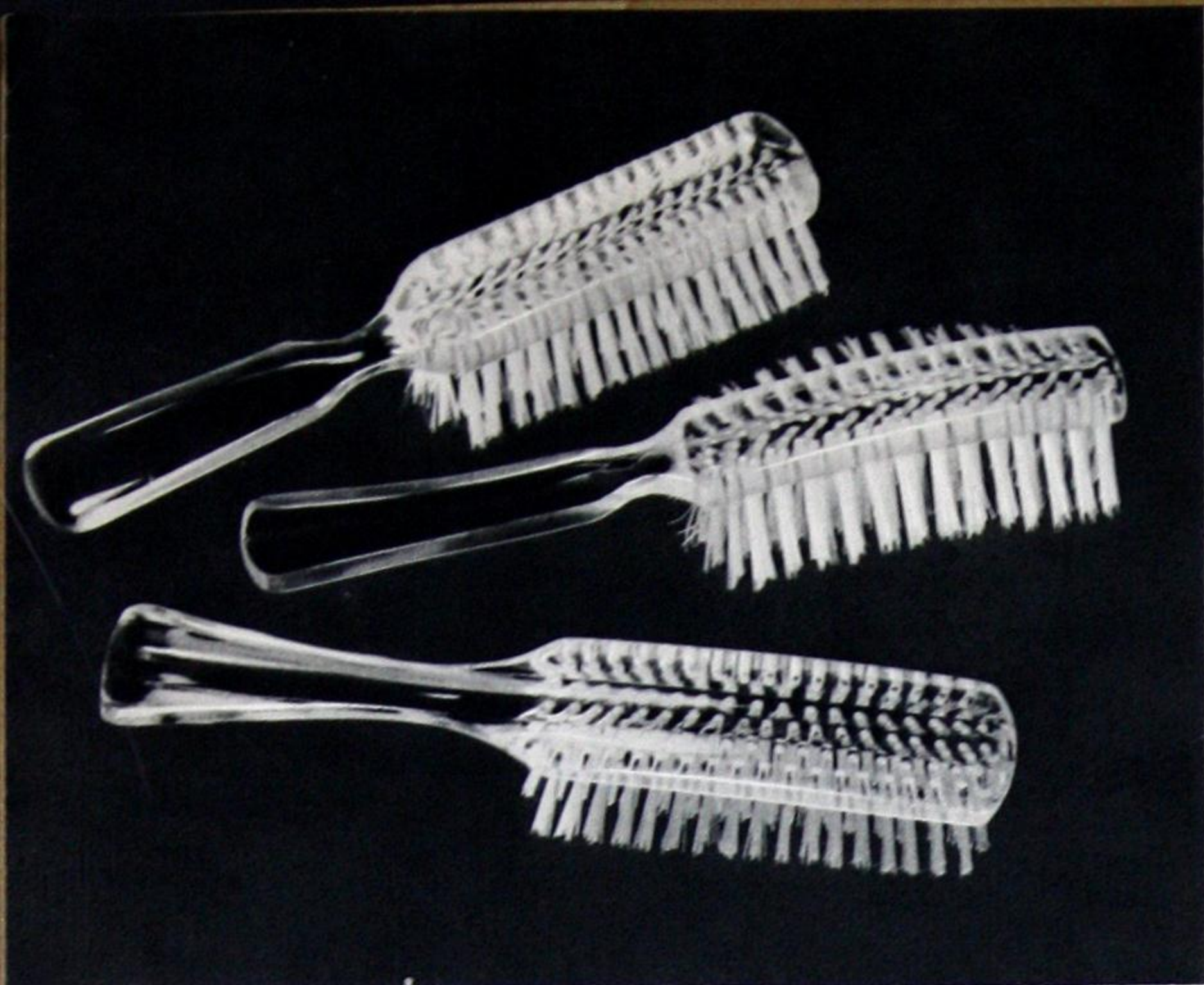
PLEXIGLAS is the natural choice for any thermoplastic molded part that will be subjected to outdoor exposure, for PLEXIGLAS moldings are virtually unaffected by weathering, aging or water immersion. Automobile hood ornaments and tail light lenses molded of PLEXIGLAS have given years of service without appreciable discoloring, warping, shrinking, or crazing. Similar stability has featured such other exterior applications as sign letters, highway markers, and industrial glazing.

resistance to weathering

Letters for service station identification, molded by Brillhart Plastics Corporation, for The Texas Company.



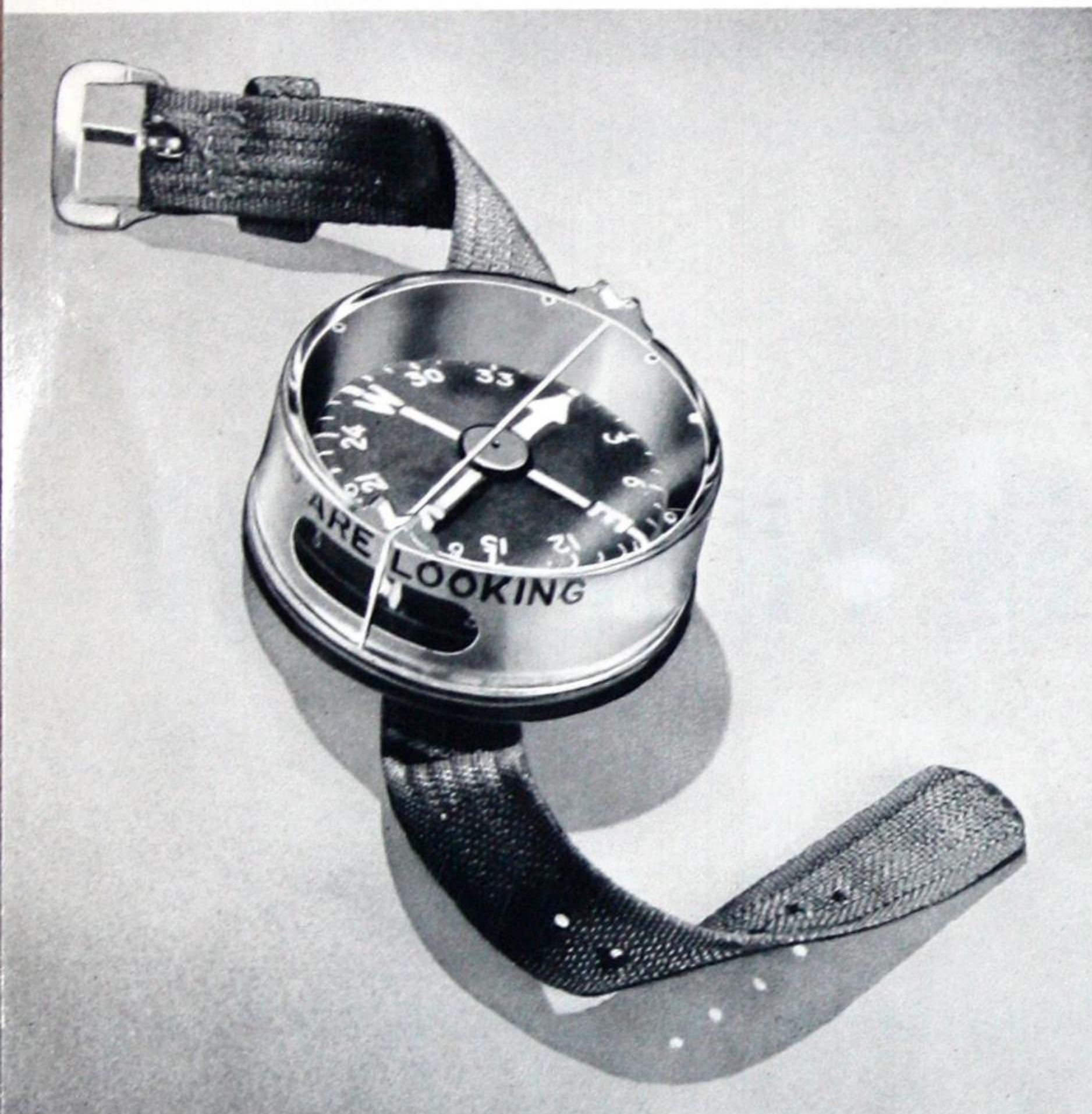
Brush backs injection molded
by Prophylactic Brush Co.



clarity and brilliance

PLEXIGLAS molding powders offer the clarity so necessary for sparkling decorative pieces. Especially in heavy-section moldings, the brilliance and color stability of PLEXIGLAS are apparent and long lasting.

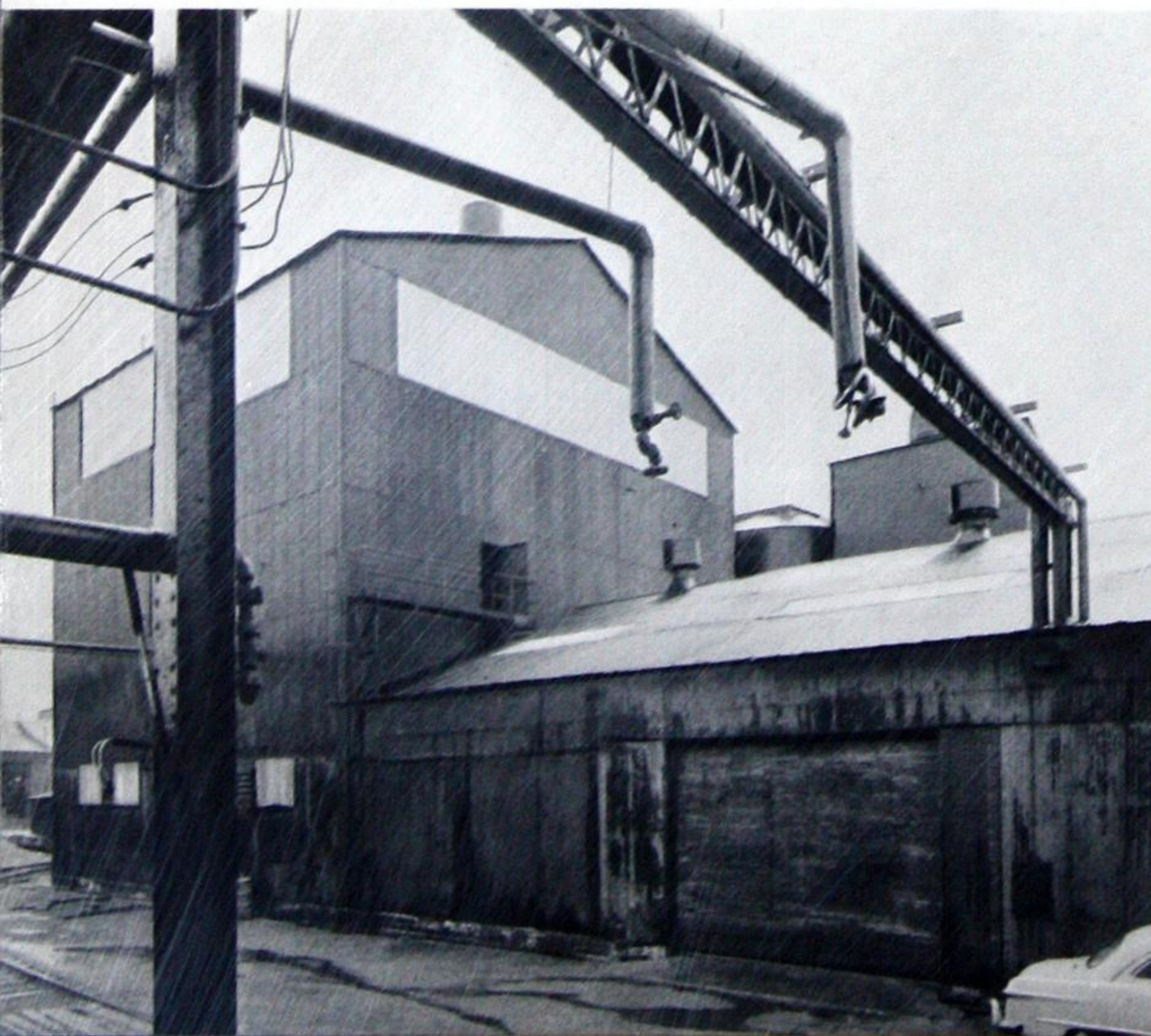
WHY PLEXIGLAS



dimensional stability

PLEXIGLAS molding powders contain no monomeric plasticizers and have low water absorption characteristics. Molded parts, as a result, have superior dimensional stability and freedom from warping.

Transparent cover for Air Force wrist compass, molded by W. Howard Stagg Plastics Engineering Co. for United States Gauge, Division of American Machine and Metals, Inc.



strength

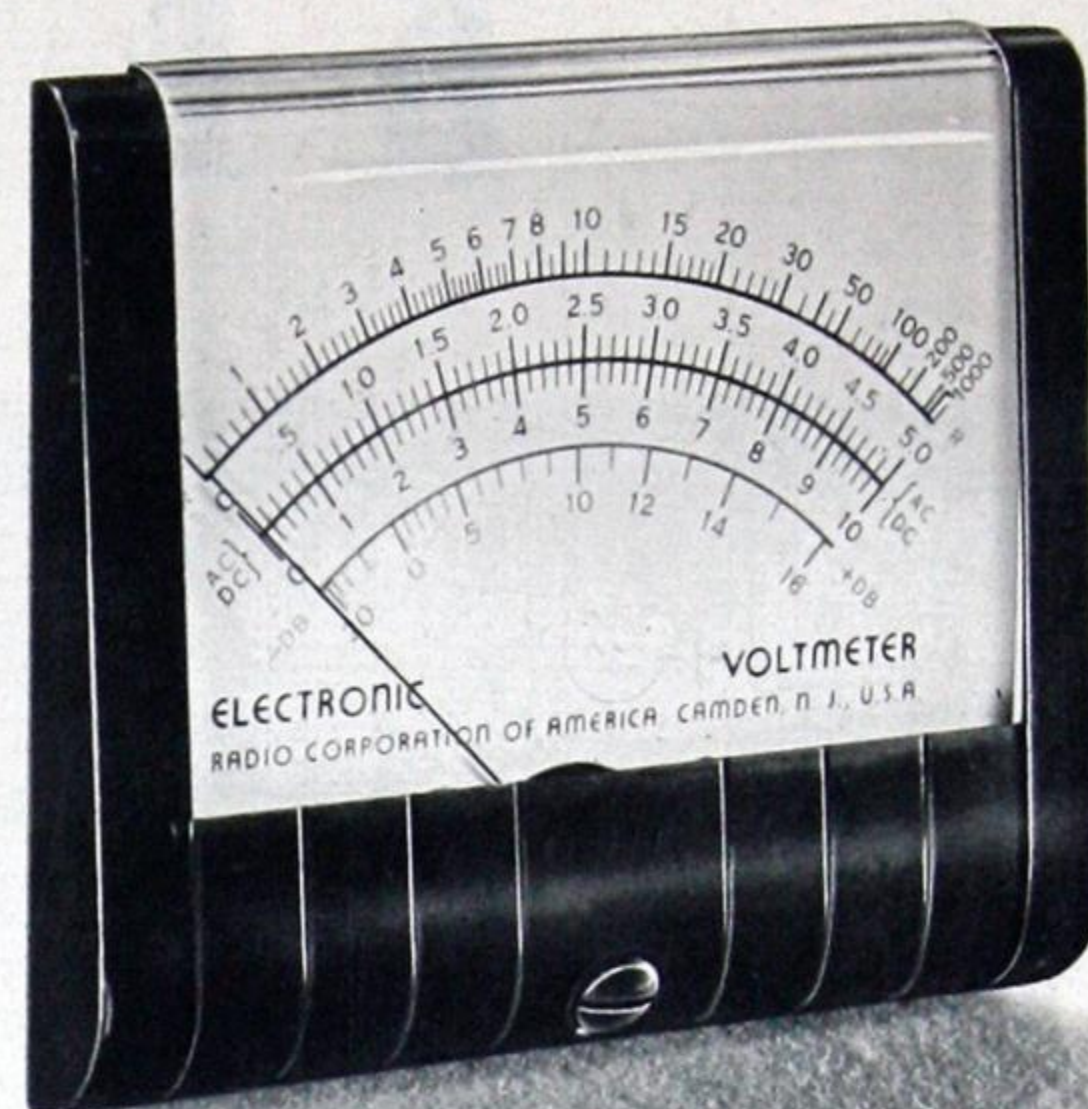
PLEXIGLAS moldings and extrusions have excellent overall strength characteristics. The resilience and high impact resistance of the material enable it to withstand hard blows and give trouble-free service under severe conditions of use.

Typical use of extruded white translucent sheets, corrugated to match standard siding and roofing materials, to provide large areas of daylight admission. Sheets extruded by Sandee Manufacturing Company.

electrical insulation

PLEXIGLAS moldings are excellent electrical insulators, showing exceptional resistance to arcing. These electrical properties are practically unaffected by long weathering or by immersion in water.

IS PREFERRED



Injection molded housing and transparent cover of RCA voltmeter.

machinability

Molded PLEXIGLAS can be readily machined, drilled, threaded or routed wherever such operations are necessary. The plastic contains no fillers or plasticizers which gum tools or make cutting edges dull.

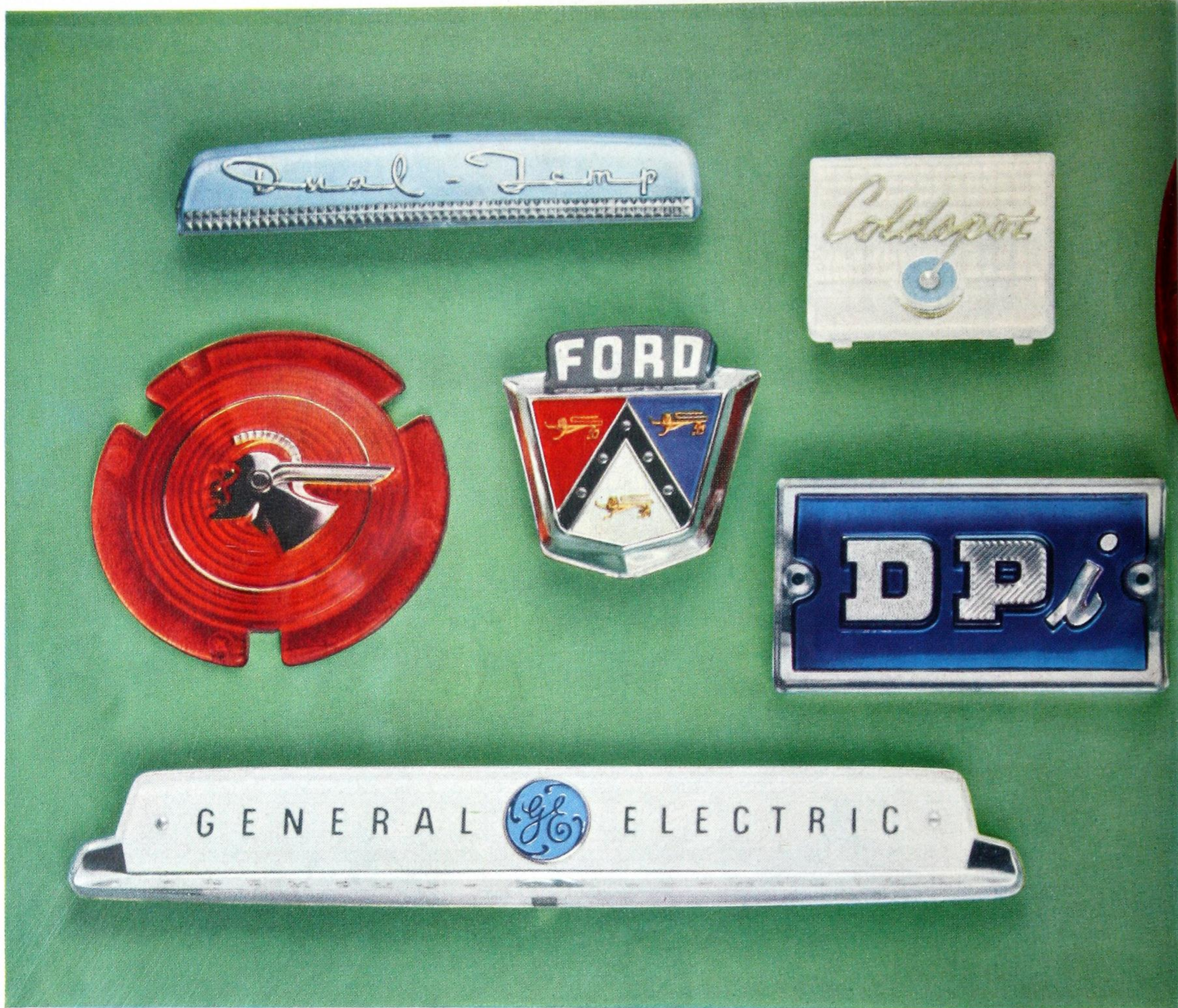
chemical resistance

An organic resin, PLEXIGLAS is attacked by alcohol, strong solvents, cleaning and fire extinguishing fluids. It is, however, unaffected by most other chemicals, including alkalis, non-oxidizing acids, salt water, photographic and battery solutions, and chemicals used in treating water.



Heavy section head for pump, injection molded by Firestone Industrial Products for Proportioneers, Inc.

BEAUTY MOLDE



PLEXIGLAS...*the aristocrat of the*

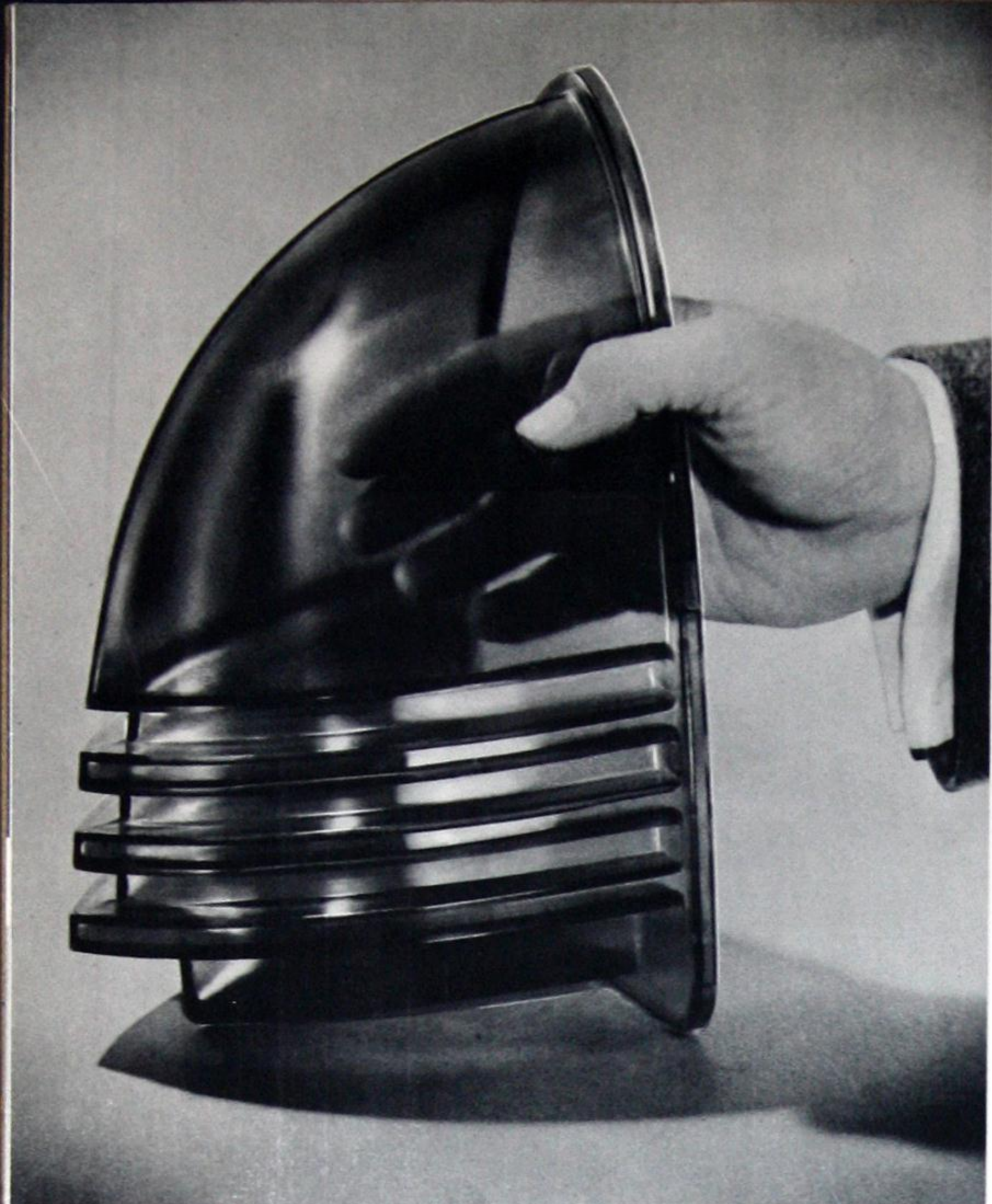
Colorful PLEXIGLAS moldings add to the sales appeal and match the durability of a wide variety of products. The examples shown above include: Admiral refrigerator escutcheon by Kent Plastics Corporation . . . Pontiac grill emblem by Inland Division of General Motors Corporation . . . Ford crest by Gits Molding Corporation and Hoosier-Cardinal Corporation . . . Coldspot refrigerator nameplate by Kent Plastics Corporation . . . Nameplate for Distillation Products Industries Division, Eastman Kodak Company, by Gits Molding Corporation . . . General Electric refrigerator nameplate by Erie Resistor Corporation . . . Nash Rambler tail light lens by Plastics

IN PLEXIGLAS



moplastic molding materials

Division, Nash-Kelvinator Corporation . . . Chrysler Imperial medallion and Chrysler steering wheel medallion by Bay Manufacturing Division, Electric Auto-Lite Company . . . Crosley refrigerator nameplate by Hoosier-Cardinal Corporation . . . Packard steering wheel medallion by Kent Plastics Corporation . . . General Electric air-conditioner nameplate by Hoosier-Cardinal Corporation . . . Pontiac front end nameplate by Inland Division of General Motors Corporation . . . Gift box for Lord and Lady Elgin watches by Kent Plastics Corporation . . . Dodge parking light lens with integrally molded bezel by Bay Manufacturing Division, Electric Auto-Lite Company.



Lincoln tall light lens,
10 $\frac{1}{4}$ " high, molded by
Erie Resistor Corporation.



Lighting fixture diffusing pans,
molded by Proton Plastics Divi-
sion, Prophylactic Brush Com-
pany, for Lightolier, Inc.

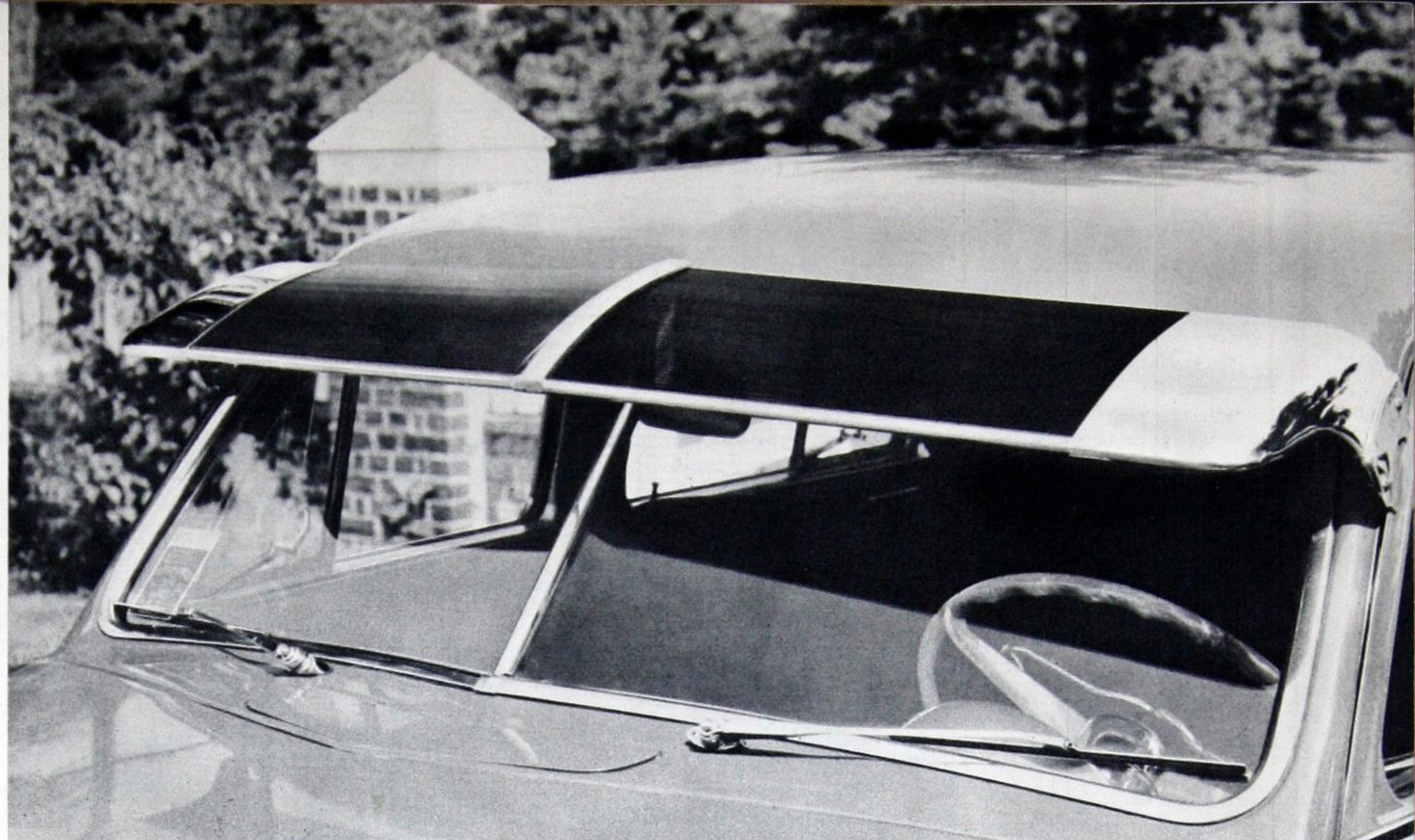
LARGE AREA INJECTION MOLDED PARTS

The excellent flow characteristics of PLEXIGLAS make possible the successful molding of large-area parts. In recent years, machinery manufacturers have increased greatly the capacity of injection molding equipment, thereby bringing the fine appearance and performance of PLEXIGLAS parts into constantly widening fields of application. Molding presses with three-hundred-ounce capacity have been installed at a number of plants, and presses with even greater capacity are being planned.



Bowl for Snow Crop fruit juice dispenser
weighs 4.25 pounds, is 12 $\frac{1}{2}$ " in diam-
eter. Molded by A. L. Hyde Company
for Olljak Manufacturing Company.

Ribbed-surface translucent green sections for automobile visor, extruded by Sandee Manufacturing Company for Snyder Manufacturing Company.



EXTRUSION

Continuous extrusion of PLEXIGLAS is a fast and economical method of production, often possible for parts having uniform cross section or profile designs. PLEXIGLAS Extrusion Grade powder gives extruded sections excellent gloss and clarity or color at high rates of extrusion. Extrusion Grade powder is available in crystal clear form and in the complete range of molding powder colors.

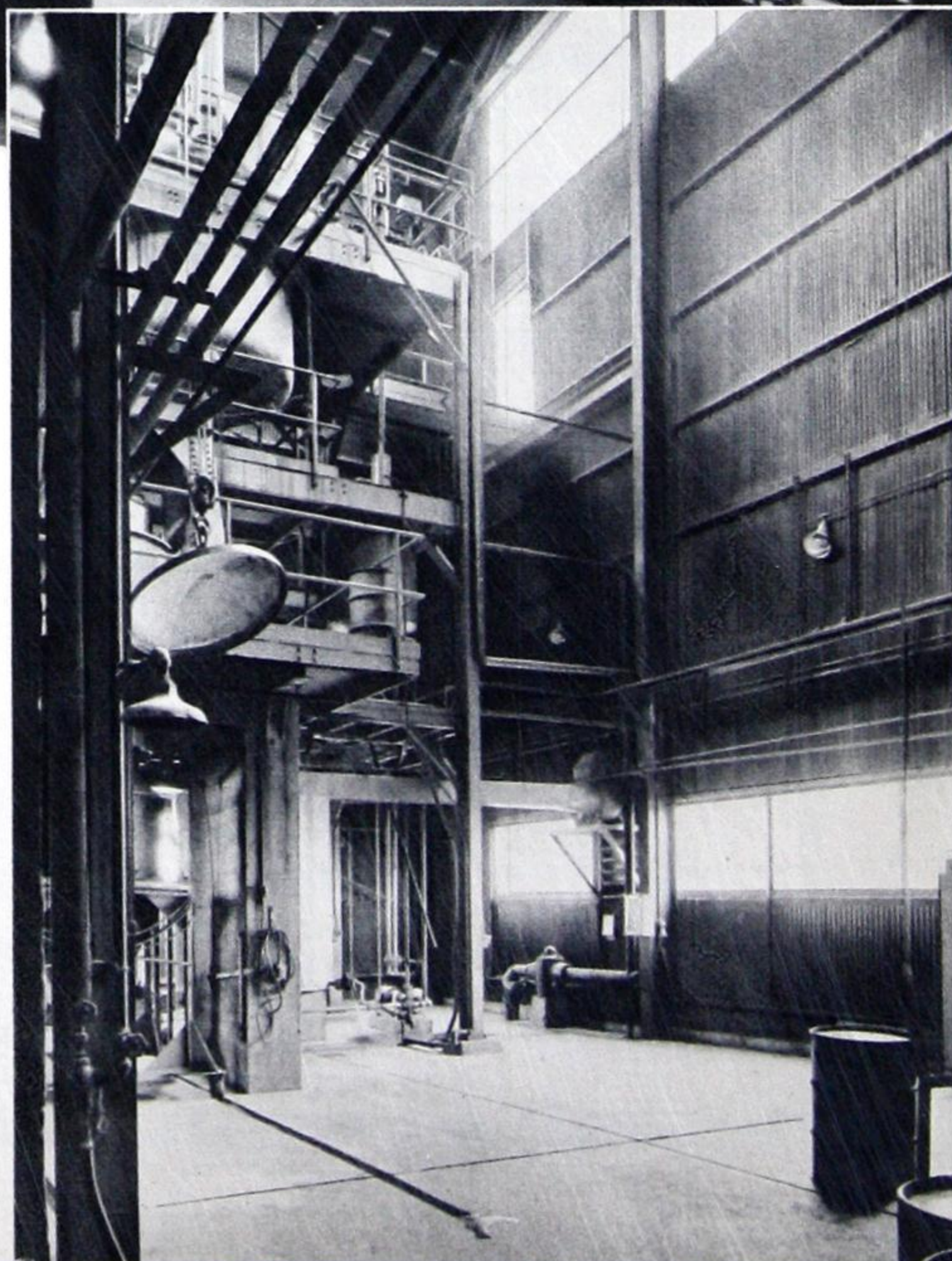
Extruded PLEXIGLAS sections are being used for such volume applications as automobile visors, lighting fixtures, counter dividers in retail stores, rods and tubes for display fixtures and industrial equipment, shower enclosures, and advertising signs.

A growing field of extruded PLEXIGLAS is that of glazing for prefabricated buildings, and for commercial and industrial structures where breakage factors are prevalent. Glazing panels extruded from PLEXIGLAS—flat and corrugated, clear and colored—are competitive on a cost plus installation basis with other glazing materials. In addition they offer the superior resistance to breakage and weather for which PLEXIGLAS is noted.

Rohm & Haas technical personnel will be glad to assist in the development of uses for extruded PLEXIGLAS.



Diffuser-reflectors on lighting fixtures at General Accounting Office, Washington, D. C., extruded by Southern Plastics Company and Plax Corporation.



Daylight admission through extruded white translucent panels mounted in roof of industrial plant. Corrugated panels extruded by Sandee Manufacturing Company.

PLEXIGLAS MOLDING POWDERS

AVERAGE PHYSICAL PROPERTIES

PLEXIGLAS is a trade mark Reg. U. S. Pat. Off. and other principal countries in the Western Hemisphere

		Average Values (not intended for specification purposes)			
		Injection			Compression
Property	Test Conditions	PLEXIGLAS VS	PLEXIGLAS VM	PLEXIGLAS V	PLEXIGLAS Y
Refractive Index	A.S.T.M. D-542-42 —	1.49	1.49	1.49	1.49
Specific Gravity	A.S.T.M. D-792-44T —	1.18	1.18	1.19	1.19
Tensile Strength	A.S.T.M. D-638-46T 1/4" specimen (0.2"/min.) Maximum, psi. Rupture, psi. Modulus of Elasticity, psi.	8000 8000 3.4 x 10 ⁵	9000 9000	9000 9000	7000 7000
Flexural Strength	A.S.T.M. D-790-45T Span-depth ratio 16(0.1"/min.) Maximum, psi. Deflection at max., inches Rupture, psi. Deflection at Rupture, inches Modulus of Elasticity, psi.	15,000 0.5 15,000 0.5 4.0 x 10 ⁵	16,000 0.5 16,000 0.5 4.8 x 10 ⁵	16,000 0.5 16,000 0.5 4.9 x 10 ⁵	12,000 >1.0 12,000 >1.0 4.5 x 10 ⁵
Compressive Strength	A.S.T.M. D-695-44T (0.2"/min.) Maximum, psi. Modulus of Elasticity, psi.	14,500 4.3 x 10 ⁵	15,000	17,000	12,000
Impact Strength	A.S.T.M. D-256-47T Charpy Unnotched (1/2" x 1/2" section) ft. lbs. Izod Molded Notch (per inch of notch) ft. lbs. Izod Milled Notch (per inch of notch) ft. lbs.	3.2 0.5 0.25	3.2 0.4 0.25	3.3 0.4 0.25	3.0 0.3
Rockwell Hardness	R & H P-20 1/4" Ball, 100 Kg. Load	M-80	M-84	M-92	M-62
Light Transmission "As Received"	A.S.T.M. D-672-42T Parallel, % Total White, % Haze, %	91 93 3	91 93 3	91 93 3	91 93 2
(after 240 hours accelerated aging)	Parallel, % Total White, % Haze, %	90 93 3	90 93 3	90 93 3	88 92 4
Effect of Accelerated Weathering on Appearance of Clear Material	LP 406a-6021 (240 hours) Crazing Discoloration Warping Unmolding	None None None None	None None None None	None None None None	None Yellowed Slightly None None
Heat Distortion Temperature	A.S.T.M. D-648-45T 1/2°C./min.-264 psi. 2°C./min.-264 psi. 2°C./min.-66 psi.	70°C. (158°F.) 75°C. (167°F.) 80°C. (176°F.)	75°C. (167°F.) 80°C. (176°F.) 85°C. (185°F.)	85°C. (185°F.) 91°C. (196°F.) 99°C. (210°F.)	62°C. (144°F.) 67°C. (153°F.) 74°C. (165°F.)
Flow Temperature	A.S.T.M. D-569-48 —	132°C. (270°F.)	140°C. (284°F.)	158°C. (316°F.)	145°C. (293°F.)
Shrinkage from Mold Dimension	A.S.T.M. D-551-41 modified (Cold mold to cold piece) mils/in. 48 hrs.	4-7	4-8	5-8	
Deformation under Load	A.S.T.M. D-621-48T 2000 psi., 24 hrs. @ 50°C., percent 4000 psi., 24 hrs. @ 50°C., percent	0.4% 1.7%	0.3% 1.0%	0.3% 0.9%	

PLEXIGLAS MOLDING POWDERS

AVERAGE PHYSICAL PROPERTIES

		Average Values (not intended for specification purposes)			
		Injection			Compression
Property	Test Conditions	PLEXIGLAS VS	PLEXIGLAS VM	PLEXIGLAS V	PLEXIGLAS Y
Dielectric Strength	A.S.T.M. D-149-44 Volts/mil	500	500	500	500
Dielectric Constant	A.S.T.M. D-150-47T				
	60 cycles	3.8	3.7	3.7	4.0
	1000 cycles	3.5	3.4	3.3	3.5
	1,000,000 cycles	2.3	2.3	2.2	3.0
Power Factor	A.S.T.M. D-150-47T				
	60 cycles	0.04	0.04	0.05	0.07
	1000 cycles	0.04	0.04	0.04	0.04
	1,000,000 cycles	0.03	0.03	0.03	0.02
Loss Factor	A.S.T.M. D-150-47T				
	60 cycles	0.16	0.16	0.19	0.28
	1000 cycles	0.13	0.12	0.12	0.14
	1,000,000 cycles	0.08	0.08	0.06	0.06
Arc Resistance	A.S.T.M. D-495-48T —	No Tracking	No Tracking	No Tracking	No Tracking
Flammability	A.S.T.M. D-635-44 Burning Rate, in./min.	0.5	0.6	0.7	1.4
Odor	—	None	None	None	None
Taste	—	None	None	None	None
Water Absorption	A.S.T.M. D-570-42				
	Wt. loss on drying, percent	0.1	0.1	0.1	0.3
	Wt. gain on immersion, percent	0.3	0.3	0.3	0.3
	Soluble matter lost, percent	0.01	0.01	0.01	0.1
	Water absorbed, percent	0.3	0.3	0.3	0.4
	Dimensional change on immersion, percent	None	None	None	None
Resistance to Chemical Agents	A.S.T.M. D-543-43 (A change in weight of 1% or less is considered negligible.) % Wt. change after seven days' immersion at 25°C. (77°F.)				
	30% Sulfuric Acid	0.3	0.3	0.3	0.3
	3% Sulfuric Acid	0.6	0.6	0.5	0.6
	10% Nitric Acid	0.6	0.6	0.4	0.5
	5% Acetic Acid	0.6	0.6	0.5	0.6
	10% Hydrochloric Acid	0.5	0.5	0.4	0.4
	Oleic Acid	-0.01	-0.01	-0.01	0.1
	10% Sodium Hydroxide	0.5	0.4	0.4	0.5
	1% Sodium Hydroxide	0.6	0.5	0.5	0.6
	10% Ammonium Hydroxide	0.6	0.6	0.5	0.7
	2% Sodium Carbonate	0.6	0.5	0.5	0.6
	10% Sodium Chloride	0.5	0.5	0.5	0.5
	3% Hydrogen Peroxide	0.7	0.6	0.6	0.7
	Distilled Water	0.7	0.6	0.6	0.6
	50% Ethyl Alcohol	6.9	5.3	2.1	0.4
	95% Ethyl Alcohol	33 Soft	28 soft, swollen	4.2	11.7
	Acetone	Dissolved	Dissolved	Dissolved	Dissolved
	Ethyl Acetate	Dissolved	Dissolved	Dissolved	Dissolved
	Ethylene Dichloride	Dissolved	Dissolved	Dissolved	Dissolved
	Carbon Tetrachloride	-24 Partially	-11 Surface	-1 Surface haze	0.6
	Toluene	Dissolved	Attacked		
	Gasoline (Heptane)	Dissolved	Dissolved	Dissolved	Dissolved
		-0.03	-0.02	0.0	0.0

granulation

Injection molding materials (formulas V, VM and VS) are supplied in the form of pellets and granules passing through a $\frac{5}{16}$ " diameter hole. Compression ratio: 2.2 maximum.

Clear compression material (formula Y) is supplied in the form of beads, all passing a U. S. No. 18 sieve. A normal average of 25-75% passes a U. S. No. 60 sieve. Compression ratio: 2.0 maximum.

colors

PLEXIGLAS molding powders are available in a wide range of transparent, translucent, and opaque colors.

branch offices

Room 1115, Statler Office Building Boston 3, Massachusetts
222 North Michigan Avenue Chicago 1, Illinois
Room 310, Southland Bldg. Annex, 209 Browder St. . . Dallas 1, Texas
410 West First Street Dayton 2, Ohio
728 Fisher Building Detroit 2, Michigan
1221 Baltimore Avenue Kansas City 6, Missouri
5657 Wilshire Blvd. Los Angeles 36, California
350 Fifth Avenue New York 1, New York
Room 532, 25 Beale Street San Francisco 5, California

PLEXIGLAS is the trade-mark registered U. S. Patent Off. and principal foreign countries in the Western Hemisphere for the acrylic resin plastics manufactured by the Rohm & Haas Company.



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